

THERMAL SENSATION AND BODY TEMPERATURE OF THE ELDERLY IN WINTER

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It is well known that human deep body temperature ( $T_b$ ) is kept at a constant level by homeostasis. However, it seems that  $T_b$  in the elderly are affected by environmental temperatures. Indeed, accidental hypothermia ( $T_b$  below  $35^\circ\text{C}$ ) in winter is now recognized as one of the natural hazards of old age in Europe. Recently, the number of elderly has also increased rapidly in Japan. However, there are few surveys on  $T_b$  and thermal sensations in the homes of elderly people in Japan. In this study,  $T_b$ , room temperatures ( $T_a$ ), thermal sensations and clothing and housing conditions of the elderly people living in their own homes in winter were surveyed and compared with the values of college-aged people.

Ninety-six elderly people (48 men and 38 women) and 79 female students living in the western part of Tokyo served as subjects. Average ( $\pm$ SD) age of the elderly male and female subjects were  $70.67(\pm 4.25)$  and  $70.02(\pm 4.11)$  years old, respectively. Female students were from 20 to 22 years old; The survey of the elderly people was done at the beginning of February for a week in 1987, and the survey of the students was done at the end of the January for three days in 1988. The subjects measured  $T_b$ ,  $T_a$  and thermal sensations at 7 a.m. and at 7 p.m.  $T_b$  were measured at the axillary at least for 10 minutes. At the same time,  $T_a$  were measured in the living rooms or bedrooms. A nine-point scale of thermal sensation was applied as follows: 1 very hot; 2 hot; 3 warm; 4 slightly warm; 5 neutral; 6 slightly cool; 7 cool; 8 cold; 9 very cold.

Average ( $\pm$ SD)  $T_b$  at 7 p.m. of the elderly males, elderly females and female students were  $36.16(\pm 0.36)$ ,  $36.03(\pm 0.35)$  and  $36.51(\pm 0.33)^\circ\text{C}$ , respectively.  $T_b$  of the elderly females were significantly lower than those of female students. Average ( $\pm$ SD)  $T_a$  at 7 p.m. of the elderly males, elderly females and female students were  $15.55(\pm 4.78)$ ,  $15.55(\pm 4.71)$  and  $18.06(\pm 3.92)^\circ\text{C}$ , respectively. Average ( $\pm$ SD) thermal sensations at 7 p.m. of the elderly males, elderly females and female students were  $4.15(\pm 1.35)$ ,  $3.82(\pm 1.27)$  and  $4.61(\pm 1.51)$ , respectively. Although,  $T_a$  of the elderly females were significantly lower than those of the female students, the elderly females felt significantly warmer than the female students. These differences between elderly and young subjects were also observed at 7 a.m.

$T_b$  of the elderly who lived in lower  $T_a$  were significantly lower than those of the others.  $T_b$  of the elderly who were not familiar with heating equipment and usually dressed lightly were significantly lower than those of the others. On the other hand,  $T_b$  of the students were not affected by  $T_a$  and these conditions. In summary,  $T_b$  of the elderly were significantly lower than those of students in winter and were affected easily by  $T_a$  and the clothing and housing conditions.